



UNITED STATES PATENT AND TRADEMARK OFFICE

cen

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/529,486	01/13/2006	Gijsbertus Rietveld	2001-1381	6763
<div>466 7590 12/13/2007</div> <div>YOUNG & THOMPSON 745 SOUTH 23RD STREET 2ND FLOOR ARLINGTON, VA 22202</div> <div>EXAMINER LEE, CYNTHIA K</div> <div>ART UNIT 1795 PAPER NUMBER</div> <div>MAIL DATE 12/13/2007 DELIVERY MODE PAPER</div>				

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/529,486

Applicant(s)

RIETVELD ET AL.

Examiner

Cynthia Lee

Art Unit

1795

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on 24 September 2007.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 25-32 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 25-32 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

Response to Amendment

This Office Action is responsive to the amendment filed on 9/24/2007. Claims 25-32 are pending. Claims 25 and 32 have been amended. Applicant's arguments have been considered, but are not persuasive. Claims 25-32 are finally rejected for reasons of record and for reasons necessitated by applicant's amendment.

Claim Rejections - 35 USC § 112

The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claims 25-32 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

In claim 25, "less than 1200 C" is not supported by the disclosure as originally filed. Applicant relies on pg 3, line 4 for support. However, the range of "1000-1200 C" does not support "less than 1200 C."

In claim 32, "less than 30 nm" is not supported by the disclosure as originally filed. Applicant relies on pg 3, line 4 for support. However, this supports an electrolyte particle size, and not support layer particle size.

Applicant is required to cancel the new matter in reply to this Office Action.

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claim 30 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. The limitation "nickel/nickel oxide" is unclear whether the slash means a mixture of elemental nickel and nickel oxide or an alternative of nickel and nickel oxide.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 25, 26, 31, and 32 are rejected under 35 U.S.C. 103(a) as being unpatentable over Visco et al. (US 2003/0059668 A1).

Visco et al. discloses structures and techniques for solid state electrochemical devices to include solid oxide fuel cells (paragraph 6, 16). The SOFC is comprised of an anode, electrolyte, and a cathode (paragraph 38). The anode and cathode electrodes and the electrolyte are supported by the substrate or support material (paragraph 4, 34). Visco et al. teaches a porous substrate constructed from one or more transitional metals

to include Cr, Fe, Cu, and Ag, or alloys thereof (paragraph 12). The chrome steel alloy of the substrate is made with powder (paragraph 35).

Visco et al. teaches forming the electrode/membrane/electrolyte on the substrate and co-firing or sintering the layered structure (paragraph 12, 14, 32). The chrome steel alloy substrate is powder and is sintered (paragraph 35). The sinter process takes place at a temperature between 1200°C and 1500 °C (paragraph 58). Regarding the temperature range of the sintering step, it has been held that a prima facie case of obviousness exists where the claimed ranges and prior art ranges do not overlap but are close enough that one skilled in the art would have expected them to have the same properties. *Titanium Metals Corp. of America v. Banner*, 778 F.2d 775, 227 USPQ 773 (Fed. Cir. 1985). See MPEP 2144.05.

The support material or substrate is comprised of ferritic or stainless steel (paragraph 54). The electrode materials are screen printed onto the electrolyte (paragraph 38).

With respect to claim 32, Visco et al. teaches that the substrate or support material may be cermet composed of Al₂O₃ and iron containing Inconel (E) (paragraph 53). The particle size of the substrate or support material is less than about 100 microns. Alternatively, Visco et al. also teaches that the other metals and alloys such as Cr, Fe, A, and/or alloys such as low-chromium ferritic steels, intermediate-chromium ferritic steels, and high-chromium ferritic steels, and alloys such as Cr₅Fe₁Y (paragraph 54). Ferritic steel is a type of stainless steel with a desirable ductility. Visco does not disclose that the particle size of the support material is less than 30 um. The particle

size of the substrate or support material is less than about 100 microns [0053]. The Examiner notes that the disclosure provides no evidence of criticality with regard to the particle size of the support layer. Therefore, given the prior art teaching of 100 microns, the claimed particle size is not seen to be an unobvious distinction over the prior art. Therefore, a limitation merely with respect to the particle size of the support material will not support patentability unless such limitation is "critical". Generally, differences in ranges will not support the patentability of subject matter encompassed by the prior art unless there is evidence indicating such ranges is critical. See MPEP 2144.05.

Claim 30 is rejected under 35 U.S.C. 103(a) as being unpatentable over Visco et al. applied to claim 25, and further in view of Kim et al. (US 6,228,521 B1).

The disclosure of Visco et al. as discussed above is incorporated herein. Visco et al. does not disclose that the anode is of nickel or nickel oxide. Kim et al. teaches a high power density solid oxide fuel cell having a graded anode. The anode is comprised of nickel oxide (col. 4 lines 59-63). The use of nickel oxide in the anode allows easy transport of fuel gases due to the porosity of the nickel anode (col. 1 lines 15-20). This in turns improves the power density of the cell. It would have been obvious to one having ordinary skill in the art at the time the invention was made to use in the fuel cell of Visco et al. nickel oxide as the anode, as taught by Kim, for the benefit of improving the power density of the cell.

Claim 27 is rejected under 35 U.S.C. 103(a) as being unpatentable over Visco et al. as applied to claim 25 above, and further in view of Third et al. (US 5,592,686).

The disclosure of Visco et al. as discussed above is incorporated herein. Visco et al. does not specifically teach the casting of a powder as a suspension and then sintering the suspension. Third et al. teaches a process for the formation of engineered porous metal structures having a controlled micro-porosity and macro-porosity. The porous metal structures include battery material and electronic and electrical components (col. 1 lines 5-20). The process teaches a colloidal suspension comprising at least one metal powder having a median particle size less than 300 microns. The suspension is casted and sintered (col. 2 lines 39-60). This process improves the mechanical strength, formability, and flexibility of the structure prior to sintering (col. 2 lines 61-64). The process is useful for the production of thin walled structures (col. 4 lines 27-28).

Claim 7 of Third et al. recites that the metal powder may be iron or composite powders or mixtures thereof. Third et al. is analogous art because it is from the same field of endeavor, the formation of a porous metal structure from a metal powder. It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the cathode electrode support method of making of Visco et al. to include the step of casting the powder as suspension and then sintering the material such as taught by Third et al. in order to increase the mechanical strength of the unsintered material and to form a metal support material having a controlled micro-porosity as taught by Third et al.

Claim 28 is rejected under 35 U.S.C. 103(a) as being unpatentable over Visco et al. as applied to claim 25 above, and further in view of Shinkai et al. (US 6, 187,468 B1).

The disclosure of Visco et al. as discussed above is incorporated herein. Visco et al. does not specifically teach a printing technique for the application of the cathode material. Shinkai et al. teaches an electrode for a fuel cell. The electrode material is applied to the support material by using a screen-printing technique (col. 10 lines 33-36). It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the cathode material application process of Visco et al. to include using a printing technique to apply the cathode material to the support substrate or material such as taught by Shinkai et al. in order to adjust the thickness of the cathode electrode as taught by Shinkai et al.

Claim 29 is rejected under 35 U.S.C. 103(a) as being unpatentable over Visco et al. as applied to claim 25 above, and further in view of Mardilovich et al. (US 7,153,601 B2).

The disclosure of Visco et al. as discussed above is incorporated herein. Visco et al. does not specifically teach a spin coating technique for the application of the cathode material. Mardilovich et al. teaches a fuel cell with embedded current collectors. Mardilovich et al. teaches that the depositing of the electrolyte, anode material, or the cathode material layers may be completed by the spin coating technique (col. 10 lines 25-31). It would have been obvious to one having ordinary skill in the art at the time the

invention was made to modify the electrolyte depositing process of Visco et al. to include using the spin coating technique to apply the electrolyte layer to the cathode material layer such as taught by Mardilovich et al. due to the simplicity of the spin coating application technique.

Alternatively, Claim 29 is rejected under 35 U.S.C. 103(a) as being unpatentable over Visco et al. as applied to claim 25 above, and further in view of LaFollette et al. (US 6,610,440 B1).

The disclosure of Visco et al. as discussed above is incorporated herein. Visco et al. does not specifically teach a spin coating technique for the application of the cathode material. LaFollette et al. teaches the construction of microscopic batteries for microelectromechanical systems. LaFollette et al. also teaches that spin coating is the application of a liquid coating to a substrate using centrifugal force and allows for even coating (col. 20 lines 53-56). The electrode material of LaFollette et al. is layered in thin layers via a spin coating technique onto a substrate (col. 20 lines 53-56; col. 21 lines 3-8). It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the electrolyte depositing process of Visco et al. to include using the spin coating technique to apply the electrolyte layer to the cathode material layer such as taught by LaFollette et al. due to the controllability afforded by the spin coating method to spread the electrolyte evenly over the cathode material (col. 20 lines 53-56)

Response to Arguments

Applicant's arguments filed 9/24/2007 have been fully considered but they are not persuasive.

Applicant asserts that Visco's teaching of 1200 C is distinct from Applicant's "less than 1200 C". In response, it has been held that a prima facie case of obviousness exists where the claimed ranges and prior art ranges do not overlap but are close enough that one skilled in the art would have expected them to have the same properties. *Titanium Metals Corp. of America v. Banner*, 778 F.2d 775, 227 USPQ 773 (Fed. Cir. 1985). See MPEP 2144.05.

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Application/Control Number:
10/529,486
Art Unit: 1795


Page 10

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Cynthia Lee whose telephone number is 571-272-8699. The examiner can normally be reached on Monday-Friday 8:30am-5pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Susy Tsang-Foster can be reached on 571-272-1293. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

ckl


RAYMOND ALEJANDRO
PRIMARY EXAMINER